

Application No. 10/606,571
Amendment Dated April 20, 2006
Reply to Office Action Dated October 20, 2005

Amendments to the Drawings:

The attached sheet of drawings includes changes to Figs. 3a and 3b. This sheet, which includes Figs. 3a and 3b replaces the original sheet including Figs. 3a and 3b. In Fig. 3a the element number 71 was removed and in Fig. 3b, the reference designation "B" was changed to "E" for the angle between element 70 and the x-axis.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

Remarks

Claims 11-26 are pending.

Claims 11-26 stand rejected.

Claims have been amended.

Claims have been cancelled.

Claims are submitted herein for review.

No new matter has been added.

In the first portion of the Office Action, the Examiner has objected to the drawings because the angle E was not shown in the Figures and in Fig. 3a, element number 70 appears to be used to designate a signal line from the encode.

Applicant begins by noting that element 70 on Fig. 3a is one of the four arms on pantograph 58 as the element line for 70 would indicate. The extraneous element number 71 on Fig. 3a has been deleted.

Regarding the angle E, Fig. 3B has been corrected to properly show this element as defined in the specification, namely the angle between arm 70 and the x-axis, which was originally improperly labeled B.

In view of these corrections Applicant respectfully requests that the objections to the figures be withdrawn.

In the next section of the Office Action, the Examiner has rejected claims 17 and 30 for being indefinite, however no reason or explanation is given. Applicant notes that there is no claim 30 in this application and further that claim 17 has been reviewed, but Applicant can find no obvious error. Applicant requests that this rejection be withdrawn.

In the next section of the Office Action, the Examiner rejected claims 11-26 under

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35 U.S.C. § 103 as being obvious over Hardy et al. (U.S. Patent No. 5,205,289) in view of Taylor et al. (U.S. Patent No. 5,396,323) and Jensen (U.S. Patent No. 5,800,423).

Applicant respectfully disagrees with the Examiner's contentions and submits the following remarks in response.

The present invention is directed to a system for improving back surgery. In particular, a system is provided for positioning and tracing a guiding channel during surgery on a patient. A first moving arm is pivotally fixed to a first fixed plane and a second moving arm is pivotally fixed to a second fixed plane. A pair of guiding channel fasteners are each coupled to the first and second moving arms and configured to attach to a guiding channel at corresponding first and second reference locations. An encoder unit is coupled to the moving arm, the encoder unit configured to provide signals so as to allow an estimate of the coordinates of the reference locations.

An imaging unit acquires images of the interior portion of the patient's body and a processor, coupled to the encoder unit, calculates a trajectory of a line extending from the surgical tool towards the interior portion of the patient to be displayed on the acquired images.

Such a device provides a significant improvement over prior art methods of performing spinal surgery. Currently in the prior art, surgical techniques strive to employ minimally invasive procedures to avoid damage to tissues intervening the skin and the spinal bone structure. Screws are inserted percutaneously in first and second pedicles via guiding tubes and guidewires. The surgeon with the help of x-ray imaging tries to estimate the correct path underneath the skin for inserting the guidewire and screws. See paragraph [0005] of the U.S. Publication of this application, Publication No. 2005/070789.

Such an arrangement provides a significant advantage in placing the guide tube in the appropriate location by coupling the guide tube to the pantograph device movements of the tube are measured by the angle encoder which in turn translates the angle of the guide tube into a trajectory into the body. This trajectory is superimposed over the fluoroscopy image so that the trajectory appears into the actual X-ray image. See further paragraphs [0094] and [0095] of the publication document.

The cited prior art fails to show such a system. The Hardy reference show a means for calculating the optical dose delivery and shape of a radiation zone to be applied to a tumor, using, for example the hypothetical beam path (from external radiation source) or brachytherapy catheter bundle 14. However, Hardy in no way implies using a coupled pantograph system for stabilizing a guide tube or the like. Rather, Hardy deals primarily with mathematical computation of dose size and direction based on the size, volume and other dimensions of the tumor.

The other cited prior art, namely Taylor and Jensen teach surgical stabilization devices. Both Jensen and Taylor teach a means for stabilizing an instrument during a surgical procedure such as laproscopic surgery (Jensen) or other remotely controlled surgical procedures using a robotic arm for the actual patient contact (Taylor). However, neither reference teaches anything about an angle encoder for use in the trajectory imposition on the image as there is no image to be superimposed on.

In forming the rejection, the Examiner simply states

“It would have been obvious to the artisan or[sic] ordinary skill to employ the pantographic mechanism to control the tool of Hardy, since Hardy teaches no particular mechanism by which the device is situated in the patient, or alternatively to employ the image superposition device of Hardy in the device of Taylor et al, since this would be useful for planning the surgery, as taught by Hardy, and in either case to employ the positional feedback mechanism of Jensen, since these are equivalent to an useful in conjunction with tactile feedback of Taylor et al. and further to employ...”

Applicants begin by noting that such an analysis is clearly using the Applicant's invention and claims as a blue print for forming the rejection, rather than finding the teaching or motivations for combination in the references themselves. The Examiner cites to no particular portion of Hardy to suggest a particular mechanism for guiding the surgery. In fact, there is no such suggestion because the Hardy reference is only for figuring the theoretical size of and direction of the dose not for actually physically inserting the dose itself. Likewise, Jensen and Taylor contain no suggestion, nor does the Examiner assert such a suggestion, to be combined with real-time imaging software to estimate location of a surgical trajectory.

For at least this reason, Applicant respectfully requests that the rejection of independent claims 11 and 18 be withdraw, as the Examiner has not adequately defined a motivation or suggestion in the references for combining their respective teachings with one another as required to form a rejection under 35 U.S.C. § 103.

However, regardless, of validity of combining the references as suggested, even if they were combined, the resulting system would still not teach or suggest all of the elements of the present invention as claimed. Because Taylor and Jensen do not include imaging software for estimating the location of trajectory of a guide tube, they do not employ any encoder units for providing signals to estimate coordinates of reference locations. Likewise, because Hardy does not contemplate an actual device for performing the surgery there is no processor coupled to an encoder unit to calculate the trajectory of a line extending from a surgical tool.

As such, the cited prior art references, either alone or in combination with one another, do not teach or suggest the present invention as claimed. For example, there is no teaching or suggestion in any one of Hardy, Taylor and Jensen that discloses an encoder unit coupled to a moving arm for providing signals to estimate the coordinates of

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the reference locations, nor is there a processor coupled to the encoder unit that calculates a trajectory of a line extending from a surgical tool towards the interior portion of the patient to be displayed on an acquired images.

For at least this reason, Applicant respectfully requests that the rejection of independent claims 11 and 18 be withdraw, as well as the rejection of all claims that depend therefrom.

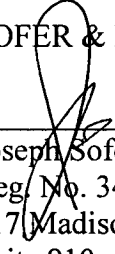
In view of the foregoing, Applicants respectfully submit that all pending claims are currently in condition for allowance, the earliest possible notice of which is earnestly solicited. If the Examiner feels that an additional telephone interview would advance the prosecution of this application he is invited to contact the undersigned at the number listed below.

Respectfully submitted

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Dated: 4/20/06

By:



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3/8

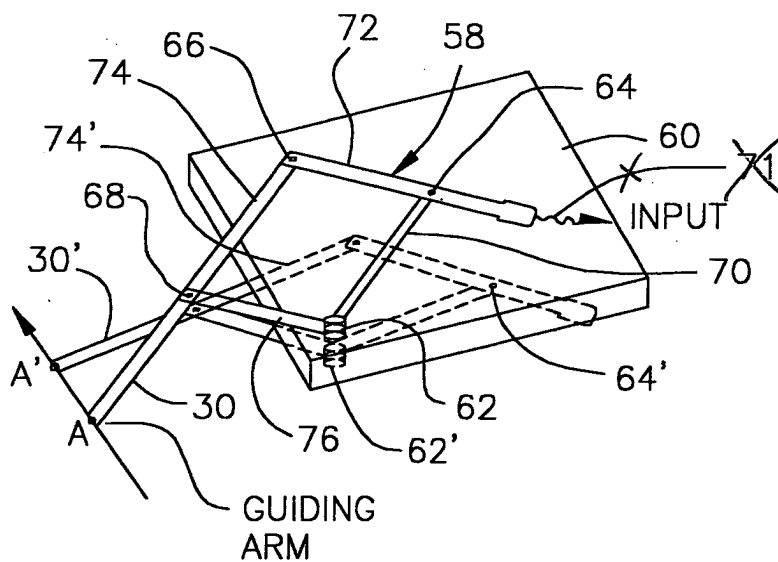


FIG. 3A

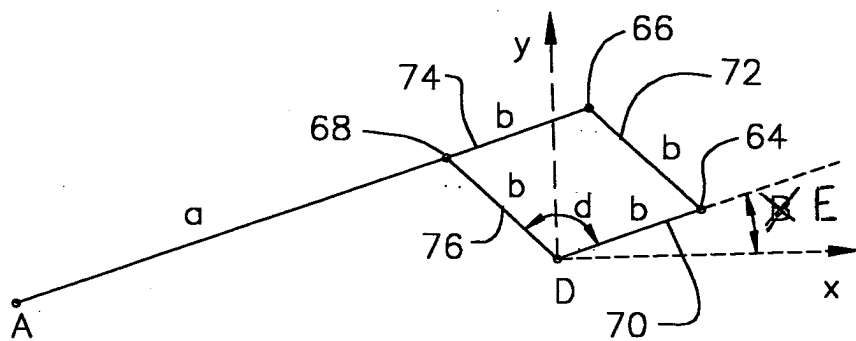


FIG. 3B